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Inventor: Matthew H. Fronk et al

Art Unit: 1795

TITLE: CORROSION RESISTANT
PEM FUEL CELL

Examiner: Tracy Mae Dove

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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APPEAL BRIEF

Sir:

On July 29, 2008, Appellants filed a Notice of Appeal from the Final Office Action of May 1, 2008. This appeal covers claims 9-172 (claims on appeal are claims 9-172) which have been rejected under 35 U.S.C. 251.

Please charge the requisite fee for filing this Appeal Brief to Assignee, General Motors Corporation, Deposit Account No. 07-0960.

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I – Real Party In Interest

The real party in interest is General Motors Corporation.

II – Related Appeals and Interferences

There are no other related appeals or interferences.

III – Status of the Claims

Claims 1-172 are pending.

Claims 1-8 have been allowed.

Claims 9-172 have been rejected under 35 U.S.C. 251.

Claims 9-172 are on appeal.

There are no other claims.

IV – Status of the Amendments

Appellants made no amendments after the final Office Action. The attached claims reflect the claims in the application as of the final Office Action dated May 1, 2008.

V – Summary of Claimed Subject Matter

Claim 9

Claim 9 recites a product comprising a fuel cell comprising a bipolar plate and an electrically conductive corrosion-resistant protective coating over the bipolar plate, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles, and a plurality of second electrically conductive particles (see column 4, lines 46-59; column 2, lines 35-41 and 52-65), the first particles being larger than the second particles, the first particles

forming interstices therebetween them and the at least a portion of the second particle filling the interstices (column 2, lines 52-65 and column 6, lines 34-42).

Claim 40

Claim 40 recites a product comprising an electrically conductive contact element for a fuel cell and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles and a plurality of second electrically conductive particles (column 2, lines 24-41; column 3, lines 26-36; column 4, lines 46-59), the first particles being larger that the second particles, and the first particles form interstices therebetween and at least a portion of the second particles filling the interstices (column 2, lines 52-58, column 6, lines 34-45).

Claim 45

Claim 45 recites a product comprising a fuel cell comprising an electrically conductive contact element and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles comprising graphite, and a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and at least a portion of the second particles filling the interstices (column 2, lines 18-41, and lines 52-65; column 3, lines 26-36, column 4, lines 46-59; column 6, lines 34-51).

Claim 65

Claim 65 recites a product comprising a fuel cell comprising an electrically conductive contact element and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble corrosion-resistant polymer and a plurality of first electrically conductive particles, the contact element comprising a first layer comprising a corrosion-susceptible metal and a second layer comprising a metal over the first layer, and wherein the coating overlies the second layer (column 4, lines 46-59; column 7, lines 1-29; FIG. 5).

Claim 80

Claim 80 recites a PEM fuel cell comprising: at least one cell comprising a pair of opposite polarity electrodes, a membrane electrolyte adjacent each of said electrodes for conducting ions therebetween, and an electrically conductive contact element having a working face confronting at least one of said electrodes for conducting electrical current from said one electrode (Col. 3, lines 26-36), said contact element comprising a corrosion-susceptible metal substrate and an electrically conductive, corrosion-resistant protective coating on said face to protect said substrate from the corrosive environment of said fuel cell (column 4, lines 46-59; column 7, lines 1-29; FIG. 5), said protective coating comprising a mixture of electrically conductive particles dispersed throughout an oxidation-resistant and acid-resistant, water-insoluble polymeric matrix, said mixture comprising graphite particles having a first particle size and other electrically conductive particles comprising at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium- alloyed titanium, nickel-alloyed titanium, rare earth metals and carbon, or

mixtures thereof (Col. 4, lines 46-65); said other particles having a second particle size less than said first particle size to enhance the packing density of said particles (Col. 2, lines 51-65).

Claim 81

Claim 81 recites a product comprising: a fuel cell comprising an electrical conductive contact element and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble polymer comprising at least one selected from the following: epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof; and a plurality of first electrically conductive particles (Col. 2, lines 26-36; Col. 4, line 46-Col. 5, line 9).

Claim 86

Claim 86 recites process comprising: applying an electrically conductive corrosion-resistant protective coating over the bipolar plate for a fuel cell, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles, and a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and the at least a portion of the second particle filling the interstices (Col. 2, lines 26-36; Col. 6, lines 34-51).

Claim 120

Claim 120 recites a process comprising: applying an electrically conductive corrosion-resistant protective coating over an electrically conductive contact element for a fuel cell, the

coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles, and a plurality of second electrically conductive particles, the first particles being larger that second particles and filling, the first particles forming interstices therebetween and at least a portion of the second particle filling the interstices, and forming a fuel cell with the electrically conductive corrosion-resistant protective coated electrically conductive contact element (Col. 2 lines 26-36; Col. 4, line 46- Col. 5, line 9; Col. 6, lines 34-51).

Claim 125

Claim 125 recites a process comprising: appying an electrically conductive corrosion-resistant protective coating over an electrically conductive contact element, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles comprising graphite, and a plurality of second electrically conductive particles, the first particles being larger that second particles and filling, the first particles forming interstices therebetween and at least a portion of the second particle filling the interstices (Col. 2, lines 26-36; Col. 6 lines 20-51).

Claim 145

Claim 145 recites a process comprising: providing a contact element for a fuel cell comprising a first layer comprising a corrosion-susceptible metal and a second layer comprising a metal over the first layer, and applying an electrically conductive corrosion-resistant protective coating over the second layer, and wherein the coating comprising a water-insoluble corrosion-resistant polymer and a plurality of first electrically conductive particles (Col. 2, lines 26-36; Col. 6 lines 20-51).

Claim 164

Claim 164 recites a process comprising: applying an electrically conductive corrosion-resistant protective coating over the contact element for a fuel cell, the coating comprising a water-insoluble polymer comprising at least one selected from the following: epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof; and a plurality of first electrically conductive particles (Col. 2, lines 26-36; Col. 4, lines 46- Col. 5, line 9; Col. 6 lines 20-51).

VI. Grounds of Rejection to be Reviewed on Appeal

Whether Claims 9-172 are unpatentable under 35 USC 251

VII. Argument

Whether Claims 9-172 are unpatentable under 35 USC 251

Claims 9-172 were rejected under 35 USC 251 because the Examiner has taken the position that a broaden reissue application was filed outside the two year statutory period. The Final Office Action of May 1, 2008 includes the statement "since the intent to broaden was not presented within 2 years of the patent date, a broadening reissue cannot be granted by the Examiner."

However, that statement and the conclusion cannot be supported by the mere fact that "Applicant does not make a statement that the reissue is a broadening reissue until the second Preliminary Amendment filed on 10/20/04, which is more than 2 years after the patent has

issued." The Examiner has made no finding of fact that intent to file a broadening reissue application was not conveyed or cannot be inferred from the reissue application declaration. The reissue declaration by the inventor included the statement that "I verily believe that the original patent to be wholly or partly inoperative or invalid, for the reasons described below (check all boxes that apply.) ... by reason of patentee claiming more or less than he had a right to claim in the patent." The statement "by reason of a patentee claiming more or less than he had a right to claim in the patent" is clearly a statement of intent to file a broadening reissue application. Clearly, where a patentee states that the patentee claimed less than he had a right to claim in the patent that patentee is intending to claim more and broaden the claims in a reissue application. Since there has been no finding of fact regarding this issue, the rejection of broadening claims in the reissue application is improper.

Appellants' Amendment filed on November 21, 2003 broadened independent claim 1 because the addition of the word "no" changed the resistivity range of the mixture. The Examiner has stated that the limitation "a resistivity no greater than about 50 ohm-cm" is present in patent claim 8. Furthermore, the Examiner states that claim 1, as amended on 11/28/03 is not broader than patent claim 8. However, such is not a basis for denial of a broadening reissue application. The Examiner has cited no authority for the position that a broadening reissue application must include a claim that is broader than every claim in the issued patent. Denial of the broadening reissue application and the rejection of claims 9-172 is therefore improper.

The Examiner has also taken the position that MPEP 1412.03 sets forth that a broadening reissue claim is a claim which enlarges the scope of the claims of the patent, i.e., a claim which is greater in scope than each and every claim of the original patent. However, MPEP 1412.03 I, Meaning of "Broadened Reissue Claim" which states:

> A claim of a reissue application enlarges the scope of the claims of the patent if it is broader in at least one respect, even though it may be narrower in other respects.
>
> A claim in a reissue which includes subject matter not covered by the patent claims enlarges the scope of the patent claims. For example, if any amended or newly-added claim in the reissue contains within its scope any conceivable product or process which would not have infringed the patent, then the reissued claims would be broader than the patent claims. Tilloitson, Ltd. v Walbro Corp., 831 F.2d 1033, 1037 n.2, 4 USPQ 2d 1450, 1453 n.2 (Fed. Cir. 1987); In re Ruth, 278 F.2d 729, 730, 126 USPQ 155, 156 (CCPA 1960); In re Rogoff, 261 F. 2d, 601, 603, 120 USPQ 185, 186 (CCPA 1958). A claim which reads on something which the original claims do not is a broadened claim. A claim would be considered a broadening claim if the patent owner would be able to sue any party for infringement who previously could not have been sued for infringement. Thus, where the original claims only the process, the reissue application adds (for the first time) product claims, the scope of the claims have been broadened since a party could not be sued for infringement of a patent based upon the claims of the original patent.

Although the Examiner's dissertation on whether claim 1 is broader in some respects and narrower in other respects than claim 8 and vice versa is interesting, such has little to do with determining whether Appellants' broadening reissue application can be properly denied. The Examiner has provided no evidence or argument to refute Appellants' position that amended claim 1 in the reissue application includes subject matter not covered by the patent claims and therefore enlarges the scope of the patent claims. Denial of Appellants' broadening reissue application is improper.

Furthermore, the Examiner has presented no evidence and made no finding that amended claim 1 would not read on something which the original claims do not and therefore is not a broadening claim. Furthermore, the Examiner has presented no evidence and made no finding that amended claim 1 would not allow a patent owner to be able to sue a party for

infringement who previously could not have been sued for infringement. Appellants repeat their position earlier stated which has not been denied by the Examiner, that if a party produced a fuel cell including the structure shown in FIG. 4 of the instant application using a plurality of electrically conductive particles dispersed throughout an oxidation-resistant and acid-resistant, water-insoluble polymer mix having a resistivity no greater than 50 ohm-cm, neither patent claim 1 nor patent claim 8 of issued Patent 6,372,376 would read on such a device. However, amended claim 1 would indeed read on the embodiment shown in FIG. 4 of the instant application, and therefore claim 1 is a broadening reissue claim and Appellants are entitled to submit subsequent broadening reissue claims as set forth in claims 9-172 after 2 years from the date the patent was granted. The Examiner has not denied such and has presented no evidence or any finding regarding Appellants' position which is completely consistent with MPEP 1412.03 as a basis for allowing a broadening reissue application.

Again, Appellants note that the Examiner has not made a finding of fact that the inclusion of the word "no" immediately prior to "greater than 50 ohm-cm" in the amendment of claim 1 did not broaden claim 1 to cover subject matter not covered by the limitation "having a resistivity greater than about 50 ohm-cm". Although claim 1 might be narrower in some respects, any amendment which broadens any aspect of claim 1 results to broaden claim 1.

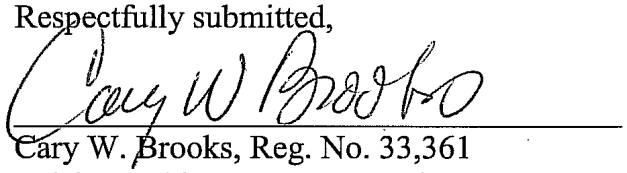
Appellants' counsel recognizes a number of informalities in the independent claims that will be corrected by amendment upon remand to the Examiner.

CONCLUSION

Appellants' original reissue application declaration and filing papers indicated that the reissue application was being filed because Appellants claimed less than they had a right to, which is a clear indication that Appellant were filing, and intended to, file a broadening reissue application. Second, with in the two year statutory period, claim 1 was amended in the original reissue application filing paper to be broader in at least one respect and therefore is a clear indication that Appellants were filing, and intended to file, a broadening reissue application.

In view of the above remarks, Appellants respectfully request reversal of the Examiner's rejection of claims 9-172.

Respectfully submitted,



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VIII – Claims Appendix

Claim 1. (Amended) In a PEM fuel cell having at least one cell comprising a pair of opposite polarity electrodes, a membrane electrolyte [intedacent] interjacent said electrodes for conducting ions therebetween, and an electrically conductive contact element having a working face confronting at least one of said [electrodessfor] electrodes for conducting electrical current from said one electrode, the improvement comprising: said contact element comprising a corrosion-susceptible metal substrate and an electrically conductive, corrosion-resistant protective coating on said face to protect said substrate from the corrosive environment of said fuel cell, said protective coating comprising a mixture of electrically conductive particles dispersed throughout an oxidation-resistant and acid-resistant, water-insoluble polymeric matrix and having a resistivity no greater than about 50 ohm-cm, said mixture comprising graphite particles having a first particle size and other electrically conductive particles selected from the group consisting of gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals and carbon, said other particles having a second particle size less than said first particle size to enhance the packing density of said particles.

Claim 2. (Original) A fuel cell according to claim 1 wherein said carbon comprises carbon black.

Claim 3. (Original) A fuel cell according to claim 1 wherein said coating is electrophoretically deposited onto said substrate from a suspension of said particles in an aqueous solution of acid-solubilized polymer.

Claim 4. (Original) A fuel cell according to claim 1 wherein a discrete film of said coating is laminated onto said substrate to form said electrically conductive contact element.

Claim 5. (Original) A fuel cell according to claim 1 wherein a precursor of said coating is deposited onto said substrate from a solution thereof, dried and cured to form said coating.

Claim 6. (Original) A fuel cell according to claim 1 wherein said substrate comprises a first acid-soluble metal underlying a second acid-insoluble, passivating metal layer susceptible to oxidation in said environment.

Claim 7. (Original) A fuel cell according to claim 1 wherein said polymer matrix is selected from the group consisting of epoxies, silicones, polyamide-imides, polyether-imides, polyphenols, fluro-elastomers, polyesters, phenoxy-phenolics, epoxide-phenolics, acrylics and urethanes.

Claim 8. (Amended) In a PEM fuel cell having at least one cell comprising a pair of opposite polarity electrodes, a membrane electrolyte [intedjacent] <u>interjacent</u> said electrodes for conducting ions therebetween, and an electrically conductive contact element having a

working face confronting at least one of said electrodes for conducting electrical current from said one electrode, the improvement comprising: said contact element comprising a corrosion-susceptible metal substrate and an electrically conductive, corrosion-resistant protective coating on said face to protect said substrate from the corrosive environment of said fuel cell, said protective coating comprising a plurality of electrically conductive particles dispersed throughout an oxidation-resistant and acid-resistant, water-insoluble polymeric matrix and having a resistivity no greater than about 50 ohm-cm, said substrate comprising a first acid-soluble metal underlying a second acid-insoluble, passivating layer susceptible to oxidation in said environment.

Claim 9. A product comprising:

a fuel cell comprising a bipolar plate and an electrically conductive corrosion-resistant protective coating over the bipolar plate, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles, and a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and the at least a portion of the second particle filling the interstices.

Claim 10. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer and a second layer over the first layer, and wherein the coating is over the second layer, and the second layer comprises at least one selected from the following: a physical vapor deposited metal, a chemical vapor deposited metal or metal clad material.

Claim 11. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising a metal.

Claim12. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising aluminum.

Claim13. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising stainless steel.

Claim 14. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising titanium.

Claim 15. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising a corrosion- susceptible metal.

Claim 16. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising a metal susceptible to oxidation.

Claim 17. A product as set forth in claim 9 wherein the bipolar plate comprises a barrier having a passivating oxide film formed thereon.

Claim 18. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising a corrosion- susceptible metal, and wherein the substrate further comprises a

second layer over the first layer, the second layer comprising a metal having a passivating oxide film formed thereon.

Claim 19. A product as set forth in claim 9 wherein the bipolar plate comprises a first layer comprising a corrosion- susceptible metal, and wherein the substrate further comprises a second layer over the first layer.

Claim 20. A product as set forth in claim 9 wherein the coating has a thickness ranging from about 15 to about 25 microns.

Claim 21. A product as set forth in claim 9 wherein the first particles have a size ranging from about 5-20 microns.

Claim 22. A product as set forth in claim 9 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 23. A product as set forth in claim 9 wherein the first particles comprise graphite.

Claim 24. A product as set forth in claim 9 wherein the second particles comprise carbon black.

Claim 25. A product as set forth in claim 9 wherein the first particles comprise graphite and the second particle comprise carbon black.

Claim 26. A product as set forth in claim 25 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 27. A product as set forth in claim 9 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 28. A product as set forth in claim 9 wherein the coating has a thickness ranging from about 5 to about 75 microns.

Claim 29. A product as set forth in claim 9 wherein the coating has a thickness ranging from about 15 to about 25 microns.

Claim 30. A product as set forth in claim 9 wherein the first particles have a size ranging from about 5-20 microns.

Claim 31. A product as set forth in claim 9 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 32. A product as set forth in claim 9 wherein the first particles comprise graphite.

Claim 33. A product as set forth in claim 9 wherein the second particles comprise carbon.

Claim 34. A product as set forth in claim 9 wherein the second particles comprise carbon black.

Claim 35. A product as set forth in claim 9 wherein the first particles comprise graphite and the second particle comprise carbon black.

Claim 36. A product as set forth in claim 35 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 37. A product as set forth in claim 9 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium,

titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 38. A product as set forth in claim 37 wherein the second particle have a size less than the first particles to enhance the packing density of the particles.

Claim 39. A product as set forth in claim 9 the polymer comprises at least one selected from the following: an epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof.

Claim 40. A product comprising:

an electrically conductive contact element for a fuel cell and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles, and a plurality of second electrically conductive particles, the first particles being larger that second particles and filling, the first particles form interstices therebetween and at least a portion of the second particle filling the interstices.

Claim 41. A product as set forth in claim 40 wherein the contact element comprises a first layer and a second layer over the first layer, and wherein the coating is over the second layer, and the second layer comprises at least one of a physical vapor deposited metal, a chemical vapor deposited metal and metal clad material.

Claim 42. A product as set forth in claim 40 wherein the contact element comprises a first layer comprising a metal.

Claim 43. A product as set forth in claim 40 wherein the contact element comprises a first layer comprising a corrosion- susceptible metal, and wherein the substrate further comprises a second layer over the first layer, the second layer comprising a metal having a passivating oxide film formed thereon.

Claim 44. A product as set forth in claim 43 wherein the first layer comprises aluminum, and the second layer comprises at least one of stainless steel and titanium.

Claim 45. A product comprising:

a fuel cell comprising an electrically conductive contact element and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles comprising graphite, and a plurality of second electrically conductive particles, the first particles being larger that second particles and filling, the first particles forming interstices therebetween and at least a portion of the second particle filling the interstices.

Claim 46. A product as set forth in claim 45 wherein the contact element comprises a first layer comprising a metal.

Claim 47. A product as set forth in claim 45 wherein the contact element comprises a first layer comprising aluminum.

Claim 48. A product as set forth in claim 45 wherein the contact element comprises a first layer comprising stainless steel.

Claim 49. A product as set forth in claim 45 wherein the contact element comprises a first layer comprising titanium.

Claim 50. A product as set forth in claim 45 wherein the contact element comprises a first layer comprising a corrosion- susceptible metal.

Claim 51. A product as set forth in claim 45 wherein the contact element comprises a first layer comprising a metal susceptible to oxidation.

Claim 52. A product as set forth in claim 45 wherein the contact element comprises a barrier having a passivating oxide film formed thereon.

Claim 53. A product as set forth in claim 45 wherein the contact element comprises a first layer comprising a corrosion- susceptible metal, and wherein the substrate further comprises a second layer over the first layer, the second layer comprising a metal having a passivating oxide film formed thereon.

Claim 54. A product as set forth in claim 45 wherein the coating has a thickness ranging from about 5 to about 75 microns.

Claim 55. A product as set forth in claim 45 wherein the coating has a thickness ranging from about 15 to about 25 microns.

Claim 56. A product as set forth in claim 45 wherein the first particles have a size ranging from about 5-20 microns.

Claim 57. A product as set forth in claim 45 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 58. A product as set forth in claim 45 wherein the bipolar plate comprises a first layer and a second layer over the first layer, and wherein the coating is over the second layer, and the second layer comprises at least one selected from the following: a physical vapor deposited metal, a chemical vapor deposited metal or metal clad material.

Claim 59. A product as set forth in claim 45 wherein the second particles comprise carbon.

Claim 60. A product as set forth in claim 45 wherein the second particles comprise carbon black.

Claim 61. A product as set forth in claim 45 wherein the first particles comprise graphite and the second particle comprise carbon black.

Claim 62. A product as set forth in claim 61 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 63. A product as set forth in claim 45 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 64. A product as set forth in claim 45 the polymer comprises at least one selected from the following an epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof.

Claim 65. A product comprising:

a fuel cell comprising an electrically conductive contact element and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble corrosion-resistant polymer and a plurality of first electrically conductive particles, the contact element comprising a first layer comprising a corrosion-

susceptible metal and a second layer comprising a metal over the first layer, and wherein the coating overlies the second layer.

Claim 66. A product as set forth in claim 65 wherein the electrically conductive contact element comprises a bipolar plate.

Claim 67. A product as set forth in claim 65 further comprising a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and the at least a portion of the second particle filling the interstices.

Claim 68. A product as set forth in claim 67 wherein the first particles comprise graphite.

Claim 69. A product as set forth in claim 67 wherein the second particles comprise carbon black.

Claim 70. A product as set forth in claim 67 wherein the first particles comprise graphite and the second particles comprise carbon black.

Claim 71. A product as set forth in claim 70 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 72. A product as set forth in claim 67 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixture thereof.

Claim 73. A product as set forth in claim 65 wherein the second layer comprises a metal clad.

Claim 74. A product as set forth in claim 65 wherein the second layer comprises a physical vapor deposited metal.

Claim 75. A product as set forth in claim 74 wherein the physical vapor deposited metal comprises titanium.

Claim 76. A product as set forth in claim 74 wherein the physical vapor deposited metal comprises stainless steel.

Claim 77. A product as set forth in claim 65 wherein the second layer comprises a chemical vapor deposited metal.

Claim 78. A product as set forth in claim 9 wherein the bipolar plate comprises a first exterior sheet and a second exterior sheet, and wherein each of the first exterior sheet and second

exterior sheet includes an underside including a plurality channels to permit coolant to flow through the bipolar plate.

Claim 79. A product as set forth in claim 45 wherein the contact element comprises a first layer and a second layer over the first layer, and wherein the coating is over the second layer, and the second layer comprises at least one of a physical vapor deposited metal, a chemical vapor deposited metal and metal clad material.

Claim 80. A PEM fuel cell comprising:

at least one cell comprising a pair of opposite polarity electrodes, a membrane electrolyte adjacent each of said electrodes for conducting ions therebetween, and an electrically conductive contact element having a working face confronting at least one of said electrodes for conducting electrical current from said one electrode, said contact element comprising a corrosion-susceptible metal substrate and an electrically conductive, corrosion-resistant protective coating on said face to protect said substrate from the corrosive environment of said fuel cell, said protective coating comprising a mixture of electrically conductive particles dispersed throughout an oxidation-resistant and acid-resistant, water-insoluble polymeric matrix, said mixture comprising graphite particles having a first particle size and other electrically conductive particles comprising at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium- alloyed titanium, nickel-alloyed titanium, rare earth metals and carbon, or mixtures thereof; said other particles having a second particle size less than said first particle size to enhance the packing density of said particles.

Claim 81. A product comprising:

a fuel cell comprising an electrical conductive contact element and an electrically conductive corrosion-resistant protective coating over the contact element, the coating comprising a water-insoluble polymer comprising at least one selected from the following: epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof; and a plurality of first electrically conductive particles.

Claim 82. A product as set forth in claim 81 wherein the first electrically conductive particle comprises graphite.

Claim 83. A product as set forth in claim 81 further comprising a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and the at least a portion of the second particle filling the interstices.

Claim 84. A product as set forth in claim 83 wherein the second electrically conductive particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 85. A product as set forth in claim 83 wherein the first electrically conductive particles comprise graphite and the second electrically conductive particles comprise carbon black.

Claim 86. A process comprising:

applying an electrically conductive corrosion-resistant protective coating over the bipolar plate for a fuel cell, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles, and a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and the at least a portion of the second particle filling the interstices.

Claim 87. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer and a second layer over the first layer, and wherein the coating is over the second layer, and the second layer comprises at least one selected from the following: a physical vapor deposited metal, a chemical vapor deposited metal or metal clad material.

Claim 88. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer comprising a metal.

Claim 89. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer comprising aluminum.

Claim 90. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer comprising stainless steel.

Claim 91. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer comprising titanium.

Claim 92. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer comprising a corrosion- susceptible metal.

Claim 93. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer comprising a metal susceptible to oxidation.

Claim 94. A process as set forth in claim 86 wherein the bipolar plate comprises a barrier having a passivating oxide film formed thereon.

Claim 95. A process as set forth in claim 86 wherein the bipolar plate comprises a first layer comprising a corrosion- susceptible metal, and wherein the substrate further comprises a second layer over the first layer, the second layer comprising a metal having a passivating oxide film formed thereon.

Claim 96. A process as set forth in claim 86 wherein the coating has a thickness ranging from about 15 to about 25 microns.

Claim 97. A process as set forth in claim 86 wherein the first particles have a size ranging from about 5-20 microns.

Claim 98. A process as set forth in claim 86 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 99. A process as set forth in claim 86 wherein the first particles comprise graphite.

Claim 100. A process as set forth in claim 86 wherein the second particles comprise carbon black.

Claim 101. A process as set forth in claim 86 wherein the first particles comprise graphite and the second particle comprise carbon black.

Claim 102. A process as set forth in claim 101 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 103. A process as set forth in claim 86 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 104. A product as set forth in claim 86 wherein the coating has a thickness ranging from about 5 to about 75 microns.

Claim 105. A process as set forth in claim 86 wherein the coating has a thickness ranging from about 15 to about 25 microns.

Claim 106. A process as set forth in claim 86 wherein the first particles have a size ranging from about 5-20 microns.

Claim 107. A process as set forth in claim 86 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 108. A process as set forth in claim 86 wherein the first particles comprise graphite.

Claim 109. A process as set forth in claim 86 wherein the second particles comprise carbon.

Claim 110. A process as set forth in claim 86 wherein the second particles comprise carbon black.

Claim 111. A process as set forth in claim 86 wherein the first particles comprise graphite and the second particle comprise carbon black.

Claim 112. A process as set forth in claim 111 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 113. A process as set forth in claim 86 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 114. A process as set forth in claim 113 wherein the second particle have a size less than the first particles to enhance the packing density of the particles.

Claim 115. A process as set forth in claim 86 the polymer comprises at least one selected from the following: an epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof.

Claim 116. A process as set forth in claim 86 wherein the applying an electrically conductive corrosion-resistant protective coating comprises laminating a preformed discrete film of a coating material onto the bipolar plate.

Claim 117. A process as set forth in claim 86 wherein the applying an electrically conductive corrosion-resistant protective coating comprises applying a precursor layer of a coating material to the bipolar plate followed by drying and curing the coating material.

Claim 118. A process as set forth in claim 86 wherein the coating material comprises a slurry comprising said particles and a solvated polymer.

Claim 119. A process as set forth in claim 86 wherein the applying an electrically conductive corrosion-resistant protective coating comprises electrophoretically depositing a coating material onto the bipolar plate.

Claim 120. A process comprising:

applying an electrically conductive corrosion-resistant protective coating over an electrically conductive contact element for a fuel cell, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles, and a plurality of second electrically conductive particles, the first particles being larger that second particles and filling, the first particles forming interstices therebetween and at least a portion of the second particle filling the interstices, and forming a fuel cell with the electrically conductive corrosion-resistant protective coated electrically conductive contact element.

Claim 121. A process as set forth in claim 120 wherein the contact element comprises a first layer and a second layer over the first layer, and wherein the coating is over the second

layer, and the second layer comprises at least one of a physical vapor deposited metal, a chemical vapor deposited metal and metal clad material.

Claim 122. A process as set forth in claim 120 wherein the contact element comprises a first layer comprising a metal.

Claim 123. A process as set forth in claim 120 wherein the contact element comprises a first layer comprising a corrosion- susceptible metal, and wherein the substrate further comprises a second layer over the first layer, the second layer comprising a metal having a passivating oxide film formed thereon.

Claim 124. A process as set forth in claim 123 wherein the first layer comprises aluminum, and the second layer comprises at least one of stainless steel and titanium.

Claim 125. A process comprising:

appying an electrically conductive corrosion-resistant protective coating over an electrically conductive contact element, the coating comprising a water-insoluble polymer and a plurality of first electrically conductive particles comprising graphite, and a plurality of second electrically conductive particles, the first particles being larger that second particles and filling, the first particles forming interstices therebetween and at least a portion of the second particle filling the interstices.

Claim 126. A process as set forth in claim 125 wherein the contact element comprises a first layer comprising a metal.

Claim 127. A process as set forth in claim 125 wherein the contact element comprises a first layer comprising aluminum.

Claim 128. A process as set forth in claim 125 wherein the contact element comprises a first layer comprising stainless steel.

Claim 129. A process as set forth in claim 125 wherein the contact element comprises a first layer comprising titanium.

Claim 130. A process as set forth in claim 125 wherein the contact element comprises a first layer comprising a corrosion- susceptible metal.

Claim 131. A process as set forth in claim 125 wherein the contact element comprises a first layer comprising a metal susceptible to oxidation.

Claim132. A process as set forth in claim 125 wherein the contact element comprises a barrier having a passivating oxide film formed thereon.

Claim 133. A process as set forth in claim 125 wherein the contact element comprises a first layer comprising a corrosion- susceptible metal, and wherein the substrate further

comprises a second layer over the first layer, the second layer comprising a metal having a passivating oxide film formed thereon.

Claim 134. A process as set forth in claim 125 wherein the coating has a thickness ranging from about 5 to about 75 microns.

Claim 135. A process as set forth in claim 125 wherein the coating has a thickness ranging from about 15 to about 25 microns.

Claim 136. A process as set forth in claim 125 wherein the first particles have a size ranging from about 5-20 microns.

Claim 137. A process as set forth in claim 125 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 138. A process as set forth in claim 125 wherein the bipolar plate comprises a first layer and a second layer over the first layer, and wherein the coating is over the second layer, and the second layer comprises at least one selected from the following: a physical vapor deposited metal, a chemical vapor deposited metal or metal clad material.

Claim 139. A process as set forth in claim 125 wherein the second particles comprise carbon.

Claim 140. A process as set forth in claim 125 wherein the second particles comprise carbon black.

Claim 141. A process as set forth in claim 125 wherein the first particles comprise graphite and the second particle comprise carbon black.

Claim 142. A process as set forth in claim 141 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 143. A process as set forth in claim 125 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 144. A process as set forth in claim 125 the polymer comprises at least one selected from the following an epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof.

Claim 145. A process comprising:

providing a contact element for a fuel cell comprising a first layer comprising a corrosion-susceptible metal and a second layer comprising a metal over the first layer, and applying an electrically conductive corrosion-resistant protective coating over the second layer,

and wherein the coating comprising a water-insoluble corrosion-resistant polymer and a plurality of first electrically conductive particles.

Claim 146. A process as set forth in claim 145 wherein the electrically conductive contact element comprises a bipolar plate.

Claim 147. A process as set forth in claim 145 further comprising a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and the at least a portion of the second particle filling the interstices.

Claim 148. A process as set forth in claim 147 wherein the first particles comprise graphite.

Claim 149. A process as set forth in claim 147 wherein the second particles comprise carbon black.

Claim 150. A process as set forth in claim 147 wherein the first particles comprise graphite and the second particles comprise carbon black.

Claim 151. A process as set forth in claim 150 wherein the first particles have a size ranging from about 5-20 microns and the second particles have a size ranging from about 0.5-1.5 microns.

Claim 152. A process as set forth in claim 147 wherein the second particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixture thereof.

Claim 153. A process as set forth in claim 145 wherein the second layer comprises a metal clad.

Claim 154. A process as set forth in claim 145 wherein the second layer comprises a physical vapor deposited metal.

Claim 155. A process as set forth in claim 154 wherein the physical vapor deposited metal comprises titanium.

Claim 156. A process as set forth in claim 154 wherein the physical vapor deposited metal comprises stainless steel.

Claim 157. A process as set forth in claim 145 wherein the second layer comprises a chemical vapor deposited metal.

Claim 158. A process as set forth in claim 145 wherein the contact element comprises a bipolar plate comprises a first exterior sheet and a second exterior sheet, and wherein each of

the first exterior sheet and second exterior sheet includes an underside including a plurality channels to permit coolant to flow through the bipolar plate.

Claim 159. A process as set forth in claim 145 wherein the contact element comprises a first layer and a second layer over the first layer, and wherein the coating is over the second layer, and the second layer comprises at least one of a physical vapor deposited metal, a chemical vapor deposited metal and metal clad material.

Claim 160. A process as set forth in claim 145 wherein the applying an electrically conductive corrosion-resistant protective coating comprises laminating a preformed discrete film of a coating material onto the bipolar plate.

Claim 161. A process as set forth in claim 145 wherein the applying an electrically conductive corrosion-resistant protective coating comprises applying a precursor layer of a coating material to the bipolar plate followed by drying and curing the coating material.

Claim 162. A process as set forth in claim 145 wherein the coating material comprises a slurry comprising said particles and a solvated polymer.

Claim 163. A process as set forth in claim 145 wherein the applying an electrically conductive corrosion-resistant protective coating comprises electrophoretically depositing a coating material onto the bipolar plate.

Claim 164. A process comprising:

applying an electrically conductive corrosion-resistant protective coating over the contact element for a fuel cell, the coating comprising a water-insoluble polymer comprising at least one selected from the following: epoxy, silicone, polyamide-imide, polyether-imide, ploy phenol, fluro-elastomer, polyester, phnoxy-phenolic, epoxide-phenolic, acrylic, urethane or mixtures thereof; and a plurality of first electrically conductive particles.

Claim 165. A process as set forth in claim 164 wherein the first electrically conductive particle comprises graphite.

Claim 166. A process as set forth in claim 165 further comprising a plurality of second electrically conductive particles, the first particles being larger than the second particles, the first particles forming interstices therebetween and the at least a portion of the second particle filling the interstices.

Claim 167. A process as set forth in claim 166 wherein the second electrically conductive particles comprise at least one selected from the following: gold, platinum, nickel, palladium, rhodium, niobium, titanium carbide, titanium nitride, titanium diboride, chromium-alloyed titanium, nickel-alloyed titanium, rare earth metals, carbon, carbon black or mixtures thereof.

Claim 168. A process as set forth in claim 164 wherein the first electrically conductive particles comprise graphite and the second electrically conductive particles comprise carbon black.

Claim169. A process as set forth in claim 164 wherein the applying an electrically conductive corrosion-resistant protective coating comprises laminating a preformed discrete film of a coating material onto the bipolar plate.

Claim 170. A process as set forth in claim 164 wherein the applying an electrically conductive corrosion-resistant protective coating comprises applying a precursor layer of a coating material to the bipolar plate followed by drying and curing the coating material.

Claim 171. A process as set forth in claim 164 wherein the coating material comprises a slurry comprising said particles and a solvated polymer.

Claim 172. A process as set forth in claim 164 wherein the applying an electrically conductive corrosion-resistant protective coating comprises electrophoretically depositing a coating material onto the bipolar plate.

IX – Evidence Appendix

IX.A – Original Declaration filed on November 11, 2003.

IX. A

PTO/SB/51 (02-01)
Approved for use through 01/31/2004. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REISSUE APPLICATION DECLARATION BY THE INVENTOR	Docket Number (Optional) H-203754

As a below named inventor, I hereby declare that:
My residence, mailing address and citizenship are stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is described and claimed in patent number US 6,372,376 B1, granted April 16, 2002, and for which a reissue patent is sought on the invention

CORROSION RESISTANT PEM FUEL CELL,

the specification of which

☒ is attached hereto.

☐ was filed on _____ as reissue application number _____/_____,
and was amended _____.
(If applicable)

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.
I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.
I verily believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☒ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

At least one error upon which reissue is based is described below. If the reissue is a broadening reissue, such must be stated with an explanation as to the nature of the broadening:

The amendment to claim 1 corrected an inadvertent error in claim 1. The word "no" should have been in the claim when the limitations of claim 12 were incorporated into claim 1 by amendment (Paper No. 4) dated June 25, 2001 during the prosecution of United States Patent No. 6,372,376.

(REISSUE APPLICATION DECLARATION BY THE INVENTOR, page 2)

Docket Number (Optional): H-203754

All errors corrected in this reissue application arose without any deceptive intention on the part of the applicant. As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith.

Name(s)	Registration Number
CARY W. BROOKS	33,361

Correspondence Address: Direct all communications about the application to:

☐ Customer Number [ ] → *Place Customer Number Bar Code Label here*

Type Customer Number here

☒ Firm or Individual Name					
Address	GENERAL MOTORS CORPORATION, Legal Staff				
Address	Mail Code 482-C23-B21, PO Box 300				
City	Detroit	State	MI	Zip	48265-3000
Country	United States of America				
Telephone	313-665-4717	Fax	313-665-4976		

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this declaration is directed.

Full name of sole or first inventor (given name, family name)
MATTHEW HOWARD FRONK

Inventor's signature [signature] Date 10-22-03

Residence **Honeoye Falls, New York, USA** Citizenship **US**

Mailing Address **66 Quaker Meeting House Road, Honeoye Falls, New York 14471, United States of America**

Full name of second joint inventor (given name, family name)
RODNEY LYNN BORUP

Inventor's signature [signature] Date 10/10/03

Residence **East Rochester, New York, USA** Citizenship **US**

Mailing Address **16 Harwood Lane, East Rochester, New York 14445, United States of America**

Full name of third joint inventor (given name, family name)
JAY S. HULETT

Inventor's signature [signature] Date 1 OCT 03

Residence **Rochester, New York, USA** Citizenship U.S.

Mailing Address **235 Nunda Boulevard, Rochester, New York 14514, United States of America**

☒ Additional joint inventors are named on separately numbered sheets attached hereto.

PTO/SB/51 (02-01)
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(REISSUE APPLICATION DECLARATION BY THE INVENTOR, page 2)

Docket Number (Optional): H-203754

All errors corrected in this reissue application arose without any deceptive intention on the part of the applicant. As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith.

Name(s)	Registration Number
CARY W. BROOKS	33,361

Correspondence Address: Direct all communications about the application to:

☐ Customer Number [ ] → *Place Customer Number Bar Code Label here*

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☒ Firm or Individual Name					
Address	GENERAL MOTORS CORPORATION, Legal Staff				
Address	Mail Code 482-C23-B21, PO Box 300				
City	Detroit	State	MI	Zip	48265-3000
Country	United States of America				
Telephone	313-665-4717	Fax	313-665-4976		

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this declaration is directed.

Full name of sole or first inventor (given name, family name): BRIAN K. BRADY

Inventor's signature: Brian K Brady	Date: 9/10/03
Residence: North Chili, New York, USA	Citizenship: US
Mailing Address: 28 Keith Terrace, North Chili, New York 14514, United States of America	

Full name of second joint inventor (given name, family name): KEVIN M. CUNNINGHAM

Inventor's signature: Kevin M. Cunningham	Date: 10/22/2003
Residence: Romeo, Michigan, USA	Citizenship: US
Mailing Address: 14850 31 Mile Road, Romeo, Michigan 48095, United States of America	

Full name of third joint inventor (given name, family name):

Inventor's signature	Date
Residence	Citizenship
Mailing Address	

☐ Additional joint inventors are named on separately numbered sheets attached hereto.

PTO/SB/96 (04-03)
Approved for use through 04/30/2003. OMB 0651-0031
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: GENERAL MOTORS CORPORATION

Application No./Patent No.: US 6,372,376 B1 Filed/Issue Date: April 16, 2002

Entitled: CORROSION RESISTANT PEM FUEL CELL

GENERAL MOTORS CORPORATION, a corporation,

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [☑] the assignee of the entire right, title, and interest; or

2. [ ] an assignee of less than the entire right, title and interest.
The extent (by, percentage) of its ownership interest is _____ %

in the patent application/patent identified above by virtue of either:

A. [☑] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 010481, Frame 0904, or for which a copy thereof is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
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3. From: _____ To: _____
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[ ] Additional documents in the chain of title are listed on a supplemental sheet.

[☑] Copies of assignments or other documents in the chain of title are attached.

[NOTE: A separate copy (*i.e.*, the original assignment document or a true copy of the original document) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

4/20/2003
Date

313-665-4717
Telephone number

CARY W. BROOKS (Reg. No. 33,361)
Typed or printed name

Cary W Brooks
Signature

Attorney
Title

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

MARCH 29, 2000

PTAS

101245077A

GENERAL MOTORS CORPORATION
LAWRENCE B. PLANT
LEGAL STAFF
P.O. BOX 33114
DETROIT, MI 48232

UNITED STATES PATENT AND TRADEMARK OFFICE
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PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 703-308-9723. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, ASSIGNMENT DIVISION, BOX ASSIGNMENTS, CG-4, 1213 JEFFERSON DAVIS HWY, SUITE 320, WASHINGTON, D.C. 20231.

RECORDATION DATE: 12/07/1999

REEL/FRAME: 010481/0904
NUMBER OF PAGES: 13

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).

ASSIGNOR:
FRONK, MATTHEW HOWARD — DOC DATE: 10/15/1999

ASSIGNOR:
BORUP, RODNEY LYNN — DOC DATE: 10/28/1999

ASSIGNOR:
HULETT, JAY S. — DOC DATE: 10/25/1999

ASSIGNOR:
BRADY, BRIAN K. — DOC DATE: 10/18/1999

ASSIGNOR:
CUNNINGHAM, KEVIN M. — DOC DATE: 11/10/1999

ASSIGNEE:
GENERAL MOTORS CORPORATION
DETROIT, MICHIGAN

SERIAL NUMBER: 09456478
PATENT NUMBER:

FILING DATE: 12/07/1999
ISSUE DATE:

ANTIONE ROYALL, EXAMINER
ASSIGNMENT DIVISION
OFFICE OF PUBLIC RECORDS

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01-14-2000

101245077

02-DEC-99

DEC 07 1999

jc678 U.S. PTO
09/456478
12/07/99

Enclosed for recording is Assignment documentation for the following patent application:

Attorney Docket No. H-203754

(1) Assignor/Inventors: MATTHEW HOWARD FRONK
RODNEY LYNN BORUP
JAY S. HULETT
BRIAN K. BRADY
KEVIN M. CUNNINGHAM

(2) Assignee: GENERAL MOTORS CORPORATION
DETROIT, MICHIGAN

(3) Assignment of patent application

(4) Application number:
If blank, this documentation is filed together with the patent application.

(5) Address correspondence to : LAWRENCE B. PLANT
General Motors Corporation
Legal Staff
P.O. Box 33114
Detroit, MI 48232

(6) Number of applications: 1
Total Fee: 40.00

(7) Date documentation executed: Oct 15,18,25,28, Nov 10, 1999

(8) Not applicable

(9) To the best of my knowledge and belief, the information contained on this cover sheet is true and correct and any copy submitted is a true copy of the original document.

Title: CORROSION RESISTANT PEM FUEL CELL

Please charge the $40.00 assignment recording fee to GENERAL MOTORS CORPORATION Deposit Account No. 07-0960.

01/13/2000 DNGUYEN 00000260 070960 09456478
01 FC:581 40.00 CH

LAWRENCE B. PLANT
313/974-1350

Total number of pages including cover sheet, attachments and document: 13

Enclosures

ASSIGNMENT

Pursuant to an agreement with my employer, I formally assign to GENERAL MOTORS CORPORATION, the entire right, title and interest, in all countries, in the improvements set forth in the United States patent application H-203754 entitled

CORROSION RESISTANT PEM FUEL CELL

for which I executed a declaration dated as indicated below. If the patent application has been filed, I authorize attorney LAWRENCE B PLANT to insert the application number and filing date of said application here in parentheses (_____ filed _____) when known.

Inventor's signature _____ Date Oct 15, 1999

Full name: MATTHEW HOWARD FRONK Declaration dated :

Residence: HONEOYE FALLS, NY October 15, 1999

Inventor's signature _____ Date _____

Full name: RODNEY LYNN BORUP Declaration dated :

Residence: EAST ROCHESTER, NY _____

Inventor's signature _____ Date _____

Full name: JAY S. HULETT Declaration dated :

Residence: ROCHESTER, NY _____

Inventor's signature _____ Date 10/18/99

Full name: BRIAN K. BRADY Declaration dated :

Residence: NORTH CHILI, NY 10/18/99

Inventor's signature _____ Date_____

Full name: KEVIN M. CUNNINGHAM Declaration dated :

Residence: ROMEO, MI _____

On this 15 day of October, _____, before me personally appeared MATTHEW HOWARD FRONK, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

James L. Saller
Notary Public
My commission expires: 8-2-01
County of Authorization:

(SEAL)

JAMES L. SALLER
NOTARY PUBLIC, State of New York
Monroe County # 4954954
My Commission Expires 8-2-01

On this _____ day of _____, _____, before me personally appeared RODNEY LYNN BORUP, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this _____ day of _____, _____, before me personally appeared JAY S. HULETT, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this 18 day of October, 1999, before me personally appeared BRIAN K. BRADY, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

James J. Faller
Notary Public
My commission expires: 03/31/01
County of Authorization: Monroe

(SEAL)

NOTARY PUBLIC
Monroe Cou:
My Commission :.

On this _____ day of _____, _____, before me personally appeared KEVIN M. CUNNINGHAM, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

ASSIGNMENT

Pursuant to an agreement with my employer, I formally assign to GENERAL MOTORS CORPORATION, the entire right, title and interest, in all countries, in the improvements set forth in the United States patent application H-203754 entitled

CORROSION RESISTANT PEM FUEL CELL

for which I executed a declaration dated as indicated below. If the patent application has been filed, I authorize attorney LAWRENCE B PLANT to insert the application number and filing date of said application here in parentheses (_____ filed _____) when known.

Inventor's signature _____ Date_____

Full name: MATTHEW HOWARD FRONK Declaration dated :

Residence: HONEOYE FALLS, NY _____

Inventor's signature  Date 10/28/99

Full name: RODNEY LYNN BORUP Declaration dated :

Residence: ~~EAST ROCHESTER, NY~~ Los Alamos NM 10/28/99

Inventor's signature _____ Date_____

Full name: JAY S. HULETT Declaration dated :

Residence: ROCHESTER, NY _____

Inventor's signature _____ Date_____

Full name: BRIAN K. BRADY Declaration dated :

Residence: NORTH CHILI, NY _____

Inventor's signature _____ Date_____

Full name: KEVIN M. CUNNINGHAM Declaration dated :

Residence: ROMEO, MI _____

On this _____ day of _____, _____, before me personally appeared MATTHEW HOWARD FRONK, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this 28th day of October, 1999, before me personally appeared RODNEY LYNN BORUP, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

OFFICIAL SEAL
CHRISTINA M. HARBERT
(SEAL)
NOTARY PUBLIC - NEW MEXICO
NOTARY BOND FILED WITH SECRETARY OF STATE
My Commission Expires 5-27-003

Christina M. Harbert
Notary Public
My commission expires: 5-27-003
County of Authorization: LOS ALAMOS

On this _____ day of _____, _____, before me personally appeared JAY S. HULETT, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this _____ day of _____, _____, before me personally appeared BRIAN K. BRADY, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this _____ day of _____, _____, before me personally appeared KEVIN M. CUNNINGHAM, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

ASSIGNMENT

Pursuant to an agreement with my employer, I formally assign to GENERAL MOTORS CORPORATION, the entire right, title and interest, in all countries, in the improvements set forth in the United States patent application H-203754 entitled

CORROSION RESISTANT PEM FUEL CELL

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Inventor's signature _____ Date_____

Full name: MATTHEW HOWARD FRONK Declaration dated :

Residence: HONEOYE FALLS, NY _____

Inventor's signature _____ Date_____

Full name: RODNEY LYNN BORUP Declaration dated :

Residence: EAST ROCHESTER, NY _____

Inventor's signature  Date 10/25/99

Full name: JAY S. HULETT Declaration dated :

Residence: CLIFTON PARK ~~ROCHESTER~~, NY 10/25/99

Inventor's signature _____ Date_____

Full name: BRIAN K. BRADY Declaration dated :

Residence: NORTH CHILI, NY _____

Inventor's signature _____ Date_____

Full name: KEVIN M. CUNNINGHAM Declaration dated :

Residence: ROMEO, MI _____

On this _____ day of _____, _____, before me personally appeared MATTHEW HOWARD FRONK, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
(SEAL) My commission expires:
County of Authorization:

On this _____ day of _____, _____, before me personally appeared RODNEY LYNN BORUP, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
(SEAL) My commission expires:
County of Authorization:

On this 25 day of October, 99, before me personally appeared JAY S. HULETT, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

Sandra E. Mac Cue
Notary Public
(SEAL) My commission expires: 8/31/01
County of Authorization: Rensselaer

SANDRA E. Mac CUE
Notary Public, State of New York
No. 4784620
Residing in Rensselaer County
Commission Expires August 31, 2001

On this _____ day of _____, _____, before me personally appeared BRIAN K. BRADY, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
(SEAL) My commission expires:
County of Authorization:

On this _____ day of _____, _____, before me personally appeared KEVIN M. CUNNINGHAM, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
(SEAL) My commission expires:
County of Authorization:

ASSIGNMENT

Pursuant to an agreement with my employer, I formally assign to GENERAL MOTORS CORPORATION, the entire right, title and interest, in all countries, in the improvements set forth in the United States patent application H-203754 entitled

CORROSION RESISTANT PEM FUEL CELL

for which I executed a declaration dated as indicated below. If the patent application has been filed, I authorize attorney LAWRENCE B PLANT to insert the application number and filing date of said application here in parentheses (_____ filed _____) when known.

Inventor's signature _____ Date_____

Full name: MATTHEW HOWARD FRONK Declaration dated :

Residence: HONEOYE FALLS, NY _____

Inventor's signature _____ Date_____

Full name: RODNEY LYNN BORUP Declaration dated :

Residence: EAST ROCHESTER, NY _____

Inventor's signature _____ Date_____

Full name: JAY S. HULETT Declaration dated :

Residence: ROCHESTER, NY _____

Inventor's signature _____ Date_____

Full name: BRIAN K. BRADY Declaration dated :

Residence: NORTH CHILI, NY _____

Inventor's signature Kevin M. Cunningham Date 11/10/99

Full name: KEVIN M. CUNNINGHAM Declaration dated :

Residence: ROMEO, MI

Sworn on this 10 day of Nov 1999

Paula Wyszynski

PAULA M. WYSZYNSKI
NOTARY PUBLIC - MACOMB COUNTY, MI
MY COMMISSION EXPIRES 8/4/2000

On this _____ day of _____, _____, before me personally appeared MATTHEW HOWARD FRONK, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this _____ day of _____, _____, before me personally appeared RODNEY LYNN BORUP, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this _____ day of _____, _____, before me personally appeared JAY S. HULETT, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this _____ day of _____, _____, before me personally appeared BRIAN K. BRADY, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

_____
Notary Public
My commission expires:
County of Authorization:

(SEAL)

On this 10 day of November, 1999, before me personally appeared KEVIN M. CUNNINGHAM, known to me to be the person who executed the foregoing instrument, and acknowledged that he/she executed the same.

Paula Wyszynski
Notary Public
My commission expires:
County of Authorization:

PAULA M. WYSZYNSKI
NOTARY PUBLIC - MACOMB COUNTY, MI
MY COMMISSION EXPIRES 9/12/2000

(SEAL)

PTO/SB/53 (02-01)
Approved for use through 01/31/2004. OMB 0651-0033
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT

Docket Number (Optional): H-203754

This is part of the application for a reissue patent based on the original patent identified below.

Name of Patentee(s): **Matthew Howard Fronk; Rodney Lynn Borup; Jay S. Hulett; Brian K. Brady; Kevin M. Cunningham**

Patent Number: **US 6,372,376 B1** | Date Patent Issued: **April 16, 2002**

Title of: **CORROSION RESISTANT PEM FUEL CELL**

1. ☒ Filed herein is a statement under 37 CFR 3.73(b). (Form PTO/SB/96)

2. ☐ Ownership of the patent is in the inventor(s), and no assignment of the patent is in effect.

One of boxes 1 or 2 above must be checked. If multiple assignees, complete this form for each assignee. If box 2 is checked, skip the next entry and go directly to "Name of Assignee".

The written consent of all assignees and inventors owning an undivided interest in the original patent is included in this application for reissue.

The assignee(s) owning an undivided interest in said original patent is/are **GENERAL MOTORS CORP.**, and the assignee(s) consents to the accompanying application for reissue.

Name of assignee/inventor (if not assigned)

GENERAL MOTORS CORPORATION

Signature: Howard N. Conkey | Date: 11/21/03

Typed or printed name and title of person signing for assignee (if assigned)

HOWARD N. CONKEY

X – Related Proceedings Appendix

None